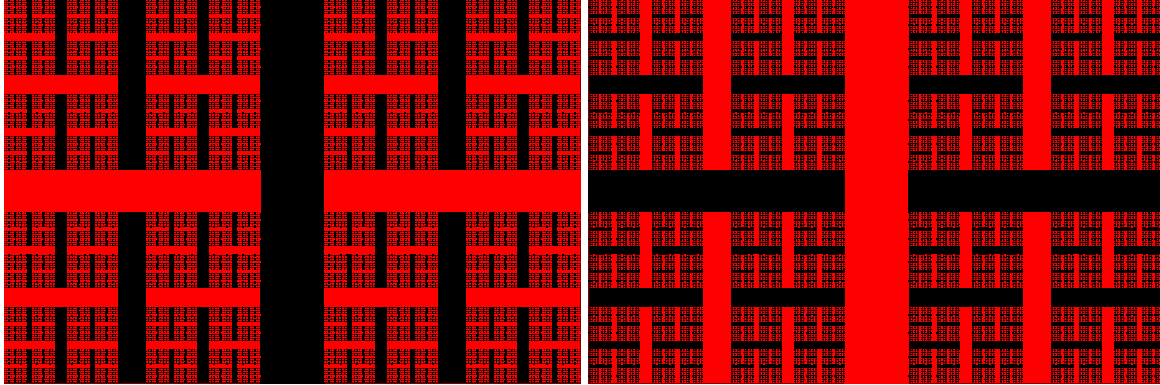# A Fractal Flag for Collectivist Mathematicians

The flag

- Obverse and Reverse

Why?

I wanted to make a mathematical flag. When I think of mathematical art, I often think of fractals. I realized that I could make a flag that could be cut apart to generate multiple smaller flags. I imagined this could be helpful if part of the flag was damaged. It could also be helpful if someone wants to join the "team"; you can always make more flags to share if you have your flag.

I honestly was not sure how well this could fit with the five basic principles of flag design, but I did my best. The eventual design achieved my original goal, but it looks like a flag only a cyborg alien species would consider using.

In this version, the two different sides allow the flag to be cut in half and flipped over to generate two flags. It is possible to make a similar version with equivalent obverse and reverse, but I haven't gotten one to look as clean as the two-sided version.
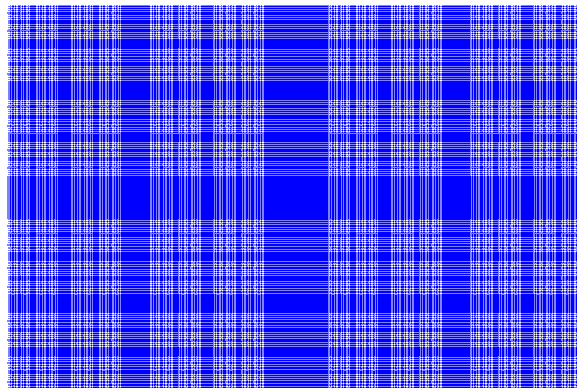

Figure 1: A possible version with equivalent obverse and reverse

Specifications

- Width is 1.
- Height is $\frac{2}{3}$.
- Large vertical stripe has width of $\frac{1}{9}$
- Largest horizontal stripes have width of $\frac{1}{9} \cdot \frac{2}{3}$ and length of $\frac{2}{3}$
- As we progressively get smaller, to the ith iteration, the stripes' width equals $\frac{1}{9} \cdot \left(\frac{2}{3}\right)^i$, and the stripes' length equals $\left(\frac{2}{3}\right)^i$.
- Each stripe is put at midpoints created by earlier iterations.

Fractals are a classic example of how a simple set of specifications can produce a complicated pattern.

Five elements of flag design (from Good Flag, Bad Flag)

1. Keep it Simple

This flag looks very complicated. However, the exact specifications are relatively simple.

2. Use meaningful symbolism

Fractals are related to some important mathematics: chaos theory and convergence of geometric series. The ability to "spread" the flag by cutting it up seems like a symbol for sharing and community. Of course, this exact community does not exist, but in some sort of sci-fi world I could imagine this flag getting used.

3. Use 2–3 basic colors

I used 2 colors. The red and black contrast well.

4. No lettering or seals

This design uses no lettering.

5. Be distinctive or be related

This flag is quite distinctive. It would be difficult to generate this flag by sewing, so it makes sense that it does not have a historical relative.